

I come from a family that puts a strong emphasis on economic gain. Almost all of my relatives work in the financial market, and see monetary compensation as the best way to care for their loved ones. Choosing a major in Physics was interpreted as a mistake by my family. However, I think that choosing to major in a scientific field yields the greatest utility for me and those around me. Research in Physics has proven to be extremely beneficial to humanity. I believe that by enrolling in a graduate program at an esteemed school, I too can help benefit others.

Being raised around financially conscious relatives, I was made aware about cost effectiveness from a young age. Ideas need to be financially viable in order to be produced, no matter how swell of an idea it might be. This, along with the fact that production is intermittent, is one reason that energy coming from renewable sources is sparse. Contemporary methods of energy storage thus far have only attained substantially low levels of efficiency. Advances in Industrial Physics, coupled with the advances in thermodynamic systems, have the potential to yield much higher efficiency levels while keeping costs at a minimum.

Such a system that could potentially boost efficiency levels of energy storage is known as pumped heat electricity storage (PHES). Methods like these have been used by André Thess of Ilmenau University of Technology in Germany. This method of energy storage, like many other forms, works by storing electrical energy in the form of heat. The heat is then transferred to a body of liquid where it can be sustained easily. Contemporary PHES systems keep the water tanks heated by running an electric current through heat-generating wires, using steam to generate a turbine, thus creating useful electricity. This method can achieve 20% efficiency. However, researches such as Thess have found that by using a heat pump to heat the water instead of relying on the current, higher efficiencies around 38% are possible. In the past decade, PHES researchers have found that even higher levels of efficiency may be achieved with different storage materials and methods. Despite all the recent success in the field, there is still much room for improvement.

I have the ambition and educational background to succeed in graduate school. I believe that for this reason, I should be allowed to pursue further education. I sincerely feel that I could help advance much needed research in energy storage systems and, more generally, thermodynamic systems. Such systems show extreme potential, and could possibly provide cost effectiveness in a field that sincerely needs the advancement. If this was the case, not only would our understanding of physical phenomena increase, but so would our ability to provide for the general welfare of those who are truly in need of it.